

REMARKS

I. Status of Claims

Claims 1 and 3-9 are pending in the application. Claim 1, 8, and 9 are independent. Claims 1 and 8 are currently amended.

The Office Action objects to claims 4-6 as being dependent upon a rejected base claim, but indicates that they would be allowable if rewritten in independent form including all of the limitations of their base claims and any intervening claims.

Claim 9 is allowed.

Claims 1-3, 7, and 8 stand rejected under 35 USC 103(a) as allegedly being unpatentable over Morinaga et al. (USP 6,830,043) ("Morinaga") in view of Gottberg (USP 5,809,773) ("Gottberg").

The Applicant respectfully requests reconsideration of these rejections in view of the foregoing amendments and the following remarks.

II. Allowable Subject Matter

The Office Action objects to claims 4-6 as being dependent upon a rejected base claim, but indicates that they would be allowable if rewritten in independent form including all of the limitations of their base claims and any intervening claims.

Claim 9 is allowed.

III. Applicant's Statement of Substance of Examiner Interview

In compliance with M.P.E.P. 713.04, the Applicant provides this Statement of Substance of Interview concerning the personal interview conducted on March 13, 2009, between Primary Examiner Nguyen and Daniel G. Shanley.

- (A) Exhibits. N/A.
- (B) Claims. Independent claims 1 and 8.
- (C) Prior art. Morinaga and Gottberg.
- (D) Amendments. Proposed amending claims 1 and 8 to clarify that the controller limits an amount of air introduced into a cylinder via an intake manifold of the internal combustion engine.
- (E) Principal arguments of Applicant. Gottberg merely discloses to control an air pump (13)

in such a manner that the excess of oxygen in an exhaust gas is decreased step by step in order to optimize the purification efficiency of the catalysts (4, 5). *See* col. 4, lines 42-54, of Gottberg. In contrast to Gottberg, certain embodiments of the present invention reduce the amount of air introduced into the engine (i.e., the intake manifold of the engine) when failure in the secondary air supply apparatus is detected.

(F) Other matters. N/A.

(G) Results. Agreement was reached that the Applicant's proposed amendments render claims 1 and 8 allowable over the prior art of record pending further search and/or consideration.

IV. Independent Claims 1 and 8

Independent claims 1 and 8 stand rejected under 35 USC 103(a) as allegedly being unpatentable over Morinaga in view of Gottberg.

The Applicant respectfully submits that claim 1 is patentable over the Morinaga and Gottberg at least because it recites, *inter alia*, “...a controller that ***limits an amount of air introduced into a cylinder via an intake manifold of the internal combustion engine to a predetermined amount when failure in the secondary air supply apparatus is detected by the detector...***” and “...wherein the controller reduces the amount of the air introduced into the cylinder via the intake manifold of the internal combustion engine to the predetermined amount in a ***stepwise manner.***” (emphasis added)

The Applicant respectfully submits that claim 8 is patentable over Morinaga and Gottberg at least because it recites, *inter alia*, “...a step of ***limiting an amount of air introduced into a cylinder via an intake manifold of the internal combustion engine to a predetermined amount when failure in the secondary air supply apparatus is detected in the step of detecting failure...***” and “...wherein in the step of limiting the amount of the air introduced into the cylinder via the intake manifold of the internal combustion engine to the predetermined amount, the air is reduced in a ***stepwise manner.***” (emphasis added)

In certain embodiments of the present invention, when failure in the secondary air supply apparatus is detected, the amount of the air introduced into the cylinder(s) via the intake

manifold the internal combustion engine is limited to the predetermined amount. Thus, when failure occurs in the secondary air supply apparatus, an amount of exhaust gas can be reduced. Therefore, for example, when the exhaust gas flows back to the secondary air supply apparatus due to failure in a component constituting the secondary air supply apparatus, it is possible to reduce an amount of the gas flowing back to the secondary air supply apparatus, and to suppress an increase in a temperature of the secondary air supply apparatus, which is caused by the exhaust gas. As a result, it is possible to provide a control apparatus for an internal combustion engine which can suppress occurrence of secondary failure.

That being said, the Office Action recognizes that Morinaga fails to disclose that the controller reduces the amount of air introduced into the engine to the predetermined amount in *a stepwise manner*. However, the Office Action contends that Gottberg addresses this deficiency of Morinaga. See page 3 of the Office Action. More specifically, the Office Action relies upon claims 1-5 of Gottberg, which are reproduced herein below.

1. A method for catalyst emission control in vehicles comprising an engine having an inlet pipe and an exhaust pipe and wherein an electrically heated start-up catalyst and a main catalyst are placed adjacent one another in the exhaust pipe, the method comprising:

activating the start-up catalyst in connection with the start-up of the engine with a pulsating current of such a nature as to produce alternate increases and reductions of the temperature of the exhaust gases;

transmitting the temperature changes to the main catalyst through the exhaust gas mixture such that said main catalyst reacts by increasing its temperature.

2. A method as claimed in claim 1, further comprising supplying a flow of air to the exhaust pipe via an air channel debouching into said exhaust pipe upstream from the start-up catalyst.

3. A method as claimed in claim 2, **further comprising regulating the flow of air supplied to the exhaust pipe to effect a successive reduction of said flow, beginning at a predetermined starting level.**

4. A method as claimed in claim 3, **wherein the flow of air supplied to the exhaust pipe is regulated to produce contents of oxygen in said exhaust gases of between 5 to**

0% above the stoichiometric oxygen level.

5. A method as claimed in claim 4, **wherein the oxygen contents of the exhaust gases are reduced stepwise.** (emphasis added)

Further, the Office Action also relies upon column 3, line 61, through, column 4, line 28, of Gottberg, which states as follows:

When the heating of the start-up catalyst 4 is cut off, there is a sudden temperature drop with resulting cooling of the start-up catalyst 4, which in turns leads to a reduction of the degree of purification obtained. However, together with the existing cool and rich exhaust gas composition, such cooling has the effect that the main catalyst 5 will react in such a manner that a transient temperature increase will take place in its catalytic material before it is cooled off. The quick decrease in the temperature of the exhaust gas mixture, together with the fact that a cool and rich exhaust mixture is present (as noted above), makes the main catalyst 5 react with a sudden increase in the temperature of the catalytic material of the main catalyst. This phenomenon is sometimes referred to as "wrong way behaviour" and is disclosed in 'Transients of Monolithic Catalytic Converters: Response to Step Changes in Feedstream Temperature as Related to Controlling Automobile Emissions', Se H. Oh & James C. Cavendish, General Motors Research Laboratories, Warren, Mich. 48090, USA, Ind. Eng. Chem. Prod. Res. Dev., Vol. 21, No. 1, 1982 which is incorporated herein by reference. This effect may be made use of in the following manner. The emission control system in accordance with the invention may be arranged in such a manner that via the control unit 16 and the switch 7 a pulsating current is supplied to the start-up catalyst 4, said current pulses causing rapid temperature increases followed by temperature reductions in the start-up catalyst 4. In combination with the prerequisite that 20 on the one hand the current supply capacity is sufficient (i.e. the power supply to the start-up catalyst 4 is sufficiently high) and on the other that the geometrical position of the start-up catalyst 4 is at a distance from the main catalyst 5 of preferably 1.5 to 2.0 times the length of the supporting 25 structure of the start-up catalyst 4, the result will be "wrong way behaviour" of the catalyst package 4, 5, which significantly contributes to

a reduction of the time required before the catalyst package 4, 5 reaches its light-off temperature.

The Applicant respectfully submits that Gottberg merely discloses to control an air pump (13) in such a manner that the excess of oxygen in an exhaust gas is decreased step by step in order to optimize the purification efficiency of the catalysts (4, 5). *See* col. 4, lines 42-54, of Gottberg. More specifically, Gottberg describes regulating flow supplied to an exhaust pipe to produce contents of oxygen in exhaust gases of between 5 to 0% above the stoichiometric oxygen level; however, it does not describe regulating such flow to *a cylinder via an intake manifold of the internal combustion engine when failure* in a secondary air supply apparatus is detected by a detector. Similarly, there is no discussion of suppressing secondary failure in Gottberg.

To summarize, in contrast to Gottberg, certain embodiments of the present invention reduce the amount of air introduced into the internal combustion engine (i.e., air introduced to the cylinder(s) via the intake manifold of the internal combustion engine (on the intake side of the engine)) when failure in the secondary air supply apparatus is detected.

As discussed in MPEP 2143.01, obviousness can *only* be established by combining or modifying the *teachings of the prior art* to produce the claimed invention where there is some *teaching, suggestion, or motivation* to do so. *In re Kahn*, 441 F.3d 977, 986, 78 USPQ2d 1329, 1335 (Fed. Cir. 2006) (discussing rationale underlying the motivation-suggestion-teaching test as a guard against using hindsight in an obviousness analysis). The Applicant respectfully submits that neither Morinaga nor Gottberg support the position that one of ordinary skill would have modified Morinaga as alleged.

Accordingly, for at least the foregoing reasons, the Applicant respectfully submits that claims 1 and 8, as well as any of their dependent claims are also patentable over the cited references.

V. Conclusion

The Applicant respectfully submits that the present application is in all aspects in allowable condition, and earnestly solicits favorable reconsideration and early issuance of a Notice of Allowance. The Examiner is invited to contact the undersigned at (202) 220-4420 to discuss any matter concerning this application. The Office is authorized to charge any fees related to this communication to Deposit Account No. 11-0600.

Respectfully submitted,

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By: /Daniel G. Shanley/
Daniel G. Shanley
Reg. No. 54,863

KENYON & KENYON LLP
1500 K Street, N.W., Suite 700
Washington, D.C. 20005
202-220-4200 (phone)
202-220-4201 (facsimile)
Customer No. 23838